STABILISED POWER SUPPLIERS PS2/67, PS2/67A, PS2/67B

Introduction

The PS2/67 and its variants each provide supplies from two separate stabilised circuits as shown in Table 1. The units are mounted on chassis CH1/26A, with index pegs in the positions shown.

Output 1 has overvoltage protection which operates at between 7·5 and 8 volts for the PS2/67 and PS2/67A and at between 15 and 16 volts for the PS2/67B. Output 2 of the PS2/67B has overvoltage protection which operates as for output 1.

All outputs have current-limiting circuits of the regenerative type which make the short-circuit current about one-third of the current on full load.

TABLE 1

Unit	*Output 1*		*Output 2*		*Index Pegs*	
	Volts	*Amps*	*Volts*	*Amps*		
PS2/67	6	1·0	24	0·5	18	42
PS2/67A	6	1·0	50	0·25	24	43
PS2/67B	12	0·75	12	0·75	24	44

Circuit Description (Fig. 1)

The two sections of all three units are similar, except for component values and for the omission of the voltage limiter in the sections providing 24-volt and 50-volt supplies. In the following description component numbers in the upper half of Fig. 1 will be used.

If this is taken to represent a 24-volt section, the rectifier circuit D1–D4 provides 30 volts d.c. across reservoir capacitor C1 on full load. The series regulator transistor TR6 is fed with a control voltage from the collector circuit of TR5. The current in this transistor is in turn controlled by the output from a stabilising amplifier TR1, TR2 and TR3, and also by a current overload limiting stage TR4. The control voltage from the stabilising amplifier is the amplified difference between the reference voltage across zener diode D6 and the proportion of the output voltage developed across R10.

The overload transistor TR4 is cut off for all output currents up to the full rated value. As the current through R15 increases above this figure, the base of TR4 becomes negative with respect to its emitter and the transistor conducts. The voltage drop across R2 increases, the collector current of TR5 falls and hence the base current to TR6 falls, thus reducing the current to the load.

The point at which TR4 conducts is set by the adjustment of its base voltage by R12, and the load current drops at this point to a fraction of full load, falling to about a third for a short-circuit load resistance.

If the power supplier is operated near its maximum rated output, care should be taken to avoid the risk of a small increase in load current, which could result in a sudden reduction in the power available from the unit.

The voltage-limiting circuit (if provided) comprises a thyristor CSR2 whose striking voltage is controlled by a zener diode D13. If the output voltage rises above about 7·5 volts (for a nominal 6 volts) or 15 volts (for a nominal 12 volts), the thyristor fires and short-circuits the output. As the shorting current (see *Test Specification*) is limited to 400 mA or less, no damage results even if no action is taken. However, the output voltage is not restored until the mains input is momentarily disconnected.

Test Specification

Mains Input

Input voltage, 240 volts ±10 per cent.

Outputs

Test information is given in Table 2.

Current Overload Circuit

The current overload circuit should be set to operate at 110 per cent of full load by turning R27 (for output 1) and R12 (for output 2) from its fully clockwise position until the output voltage drops by about 10 per cent from its nominal value when 110 per cent of full load current is drawn.

TABLE 2

Parameter	*Output*			
	6 Volts	*12 Volts*	*24 Volts*	*50 Volts*
Voltage control	R25	R25 R10	R10	R10
Output impedance (d.c.)	0·4 Ω	0·6 Ω	1·0 Ω	2·0 Ω
Output impedance (a.c.) (up to 100 kHz)	1·2 Ω	1·8 Ω	3·0 Ω	6·0 Ω
Output ripple at full load (p–p)	< 12 mV	< 9 mV	< 6 mV	< 3 mV
Short-circuit current (mA)	300 ±100	250 ±80	130 ±30	80 ±20
Maximum over-voltage	7·5–8 V	15–16 V	—	—

Overvoltage Test

(*a*) *Output 1: All Units*

With the outputs open-circuited, connect PLA pin 4 momentarily to the base of TR9. Thyristor CSR1 should fire and the voltage on PLA pins 4 and 5 should be reduced from 6 or 12 volts to 1·5 ±0·5 volts. Switch off the mains for a few seconds, and on switching on again the normal output voltage should be restored.

Note that, if the negative side of the capacitor C5 is connected by accident to PLA 5, the thyristor will fire and cause fuse FS3 to blow.

(*b*) *Output 2: PS2/67B Only*

With the outputs open-circuited, connect PLA pin 6 momentarily to the base of TR3. Thyristor CSR2 should fire and the voltage on PLA pins 6 and 7 should be reduced from 12 volts to 1·5 ±0·5 volts. The normal output voltage can be restored by switching off as before.

If the negative side of C1 is connected by accident to PLA 7, the thyristor will fire and cause FS2 to blow.

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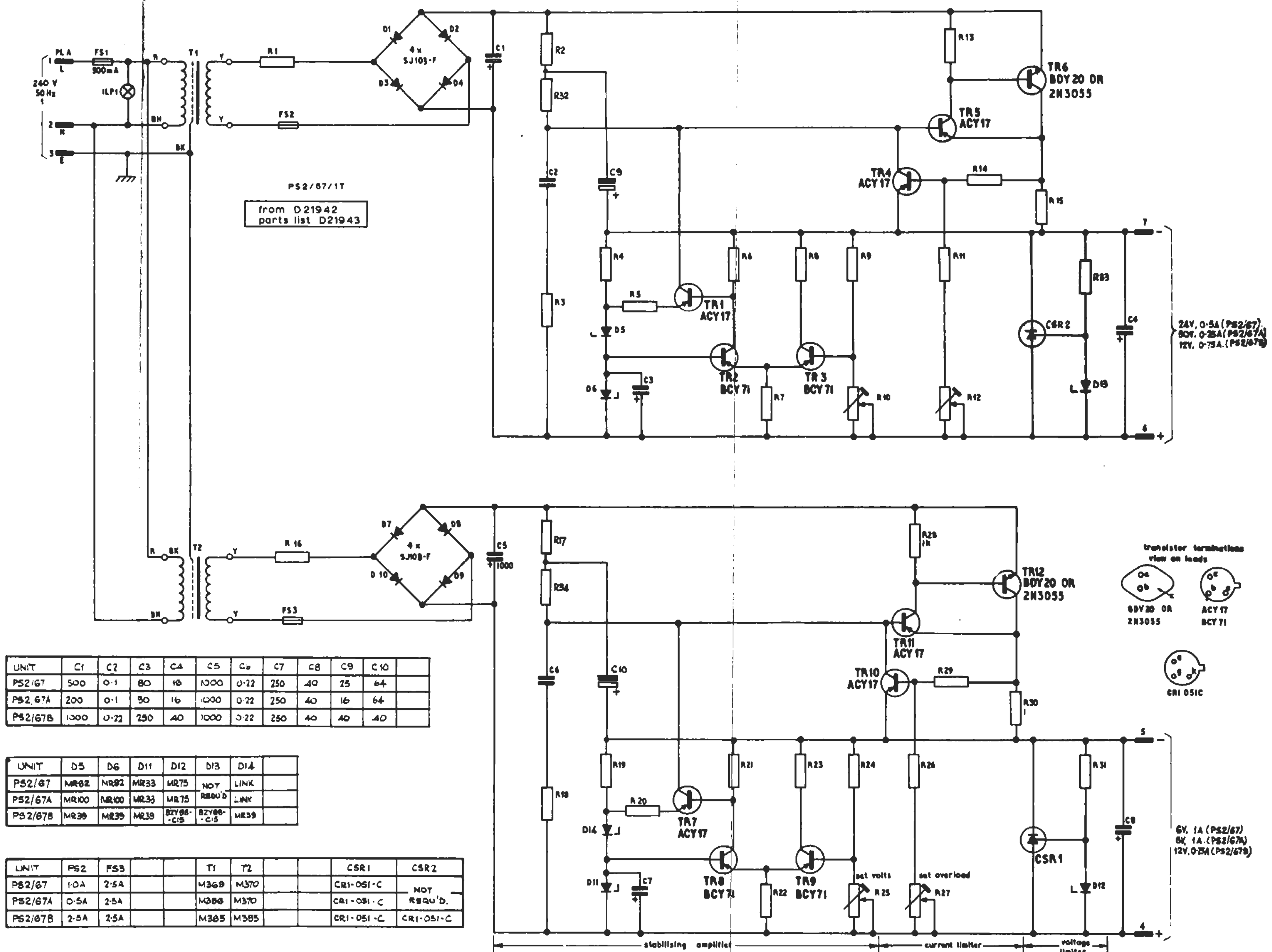

UNIT	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	
PS2/67	500	0·1	80	16	1000	0·22	250	40	25	64	
PS2/67A	200	0·1	50	16	1000	0·22	250	40	16	64	
PS2/67B	1000	0·22	250	40	1000	0·22	250	40	40	40	

UNIT	D5	D6	D11	D12	D13	D14	
PS2/67	MR82	MR82	MR33	MR75	NOT REQU'D	LINK	
PS2/67A	MR100	MR100	MR33	MR75		LINK	
PS2/67B	MR39	MR39	MR39	BZY88-C15	BZY88-C15	MR39	

UNIT	FS2	FS3			T1	T2			CSR1	CSR2
PS2/67	1·0A	2·5A			M369	M370			CR1-051-C	NOT REQU'D.
PS2/67A	0·5A	2·5A			M368	M370			CR1-051-C	
PS2/67B	2·5A	2·5A			M385	M385			CR1-051-C	CR1-051-C

UNIT	R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12	R13	R14	R15	R16	R17
PS2/67	LINK	1·1k	10	820	270	3·9k	1·8k	10	1·6k	2·2k	1k	22k	1k	330	2·2	0·5	510
PS2/67A	LINK	10k	20	7·5k	3·9k	27k	4·7k	10	13k	5·6k	47k	100k	1k	820	3·9	0·5	510
PS2/67B	LINK	750	4·7	390	200	1k	560	10	820	1k	470	10k	1k	100	1·5	LINK	750

UNIT	R18	R19	R20	R21	R22	R23	R24	R25	R26	R27	R28	R29	R30	R31	R32	R33	R34
PS2/67	2·2	100	47	220	330	10	100	470	220	4·7k	1k	100	1	1k	1·1k	NOT REQU'D.	510
PS2/67A	2·2	100	47	220	330	10	100	470	220	4·7k	1k	100	1	1k	10k		510
PS2/67B	4·7	390	200	1k	560	10	820	1k	470	10k	1k	100	1·5	2·2k	750	2·2k	750

Fig. 1. Circuit of PS2/67 & A & B